

**ABSTRACT**Word Length Reduction Circuit

The present invention relates to noise shaping, especially although not exclusively for digital audio signal processing; and in particular for PCM-PWM converters in a digital amplifier. The present invention provides a Converter for converting a pulse coded modulation (PCM) digital audio signal to a pulse width modulated (PWM) digital audio signal for amplification in a digital amplifier; the Converter comprising: a word length reduction circuit for quantising an N-bit input signal sample into an n-bit output signal sample; the circuit comprising: an input for receiving the N-bit input signal samples; a quantiser coupled to the input, and arranged to output an n-bit signal corresponding to the N-bit input sample signal; a feedback loop comprising a loop filter coupled between the output of the quantiser and the word length reduction circuit input, the loop filter having a second feedback loop coupled between the output and the input of the loop filter; and a modulator for converting the PCM signals to PWM signals, the modulator coupled to the output of the quantising circuit. There is also provided an improved lineariser which combines an interpolator to determine intermediate samples and straight line approximations between all the samples to determine a more accurate cross point for linearising the output sample values.